

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
7 April 2005 (07.04.2005)

PCT

(10) International Publication Number  
**WO 2005/030640 A1**

(51) International Patent Classification<sup>7</sup>: **C01B 31/02**

(21) International Application Number:  
PCT/US2004/031404

(22) International Filing Date:  
23 September 2004 (23.09.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
10/669,150 23 September 2003 (23.09.2003) US

(71) Applicant (for all designated States except US): **INTEL CORPORATION** [US/US]; 2200 Mission College Boulevard, Santa Clara, CA 95052 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **ZHANG, Yuegang** [CN/US]; 7974 Woodlark Way, Cupertino, CA 95014 (US). **HANNAH, Eric** [US/US]; 3046 Strawberry Hill, Pebble Beach, CA 93953 (US). **KOO, Tae-Woong** [KR/US]; 10396 Menhart Lane, Cupertino, CA 95014 (US).

(74) Agent: **HAILE, Lisa, A.**; Gray Cary Ware and Freidenrich, LLP, 4365 Executive Drive, Suite 1100, San Diego, CA 92121 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Published:**

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: SORTING OF SINGLE-WALLED CARBON NANOTUBES USING OPTICAL DIPOLE TRAPS

(57) Abstract: In embodiments of the present invention, the electric field of a focused laser beam induces a dipole in a single-walled carbon nanotube. The single-walled carbon nanotube has one or more resonant frequencies. When the frequency of the laser beam is less than a resonance frequency of the single-walled carbon nanotube, the single-walled carbon nanotube may be trapped and the laser beam may move the single-walled carbon nanotube from a first microfluidic laminar flow to a second microfluidic laminar flow. When the frequency of the laser beam is higher than a resonant frequency of the single-walled carbon nanotube, the single-walled carbon nanotube may be repelled and the laser beam may not move the single-walled carbon nanotube.



**WO 2005/030640 A1**